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Catch Basin Sediment Quality Assurance/Quality Control Plan (Split Sampling Between Rainier Commons, Seattle Public Utility and King County)

Former Rainier Brewery Property
3100 Airport Way South
Seattle, Washington
King County

Prepared for:

Rainier Commons, LLC
c/o Ariel Development, LLC
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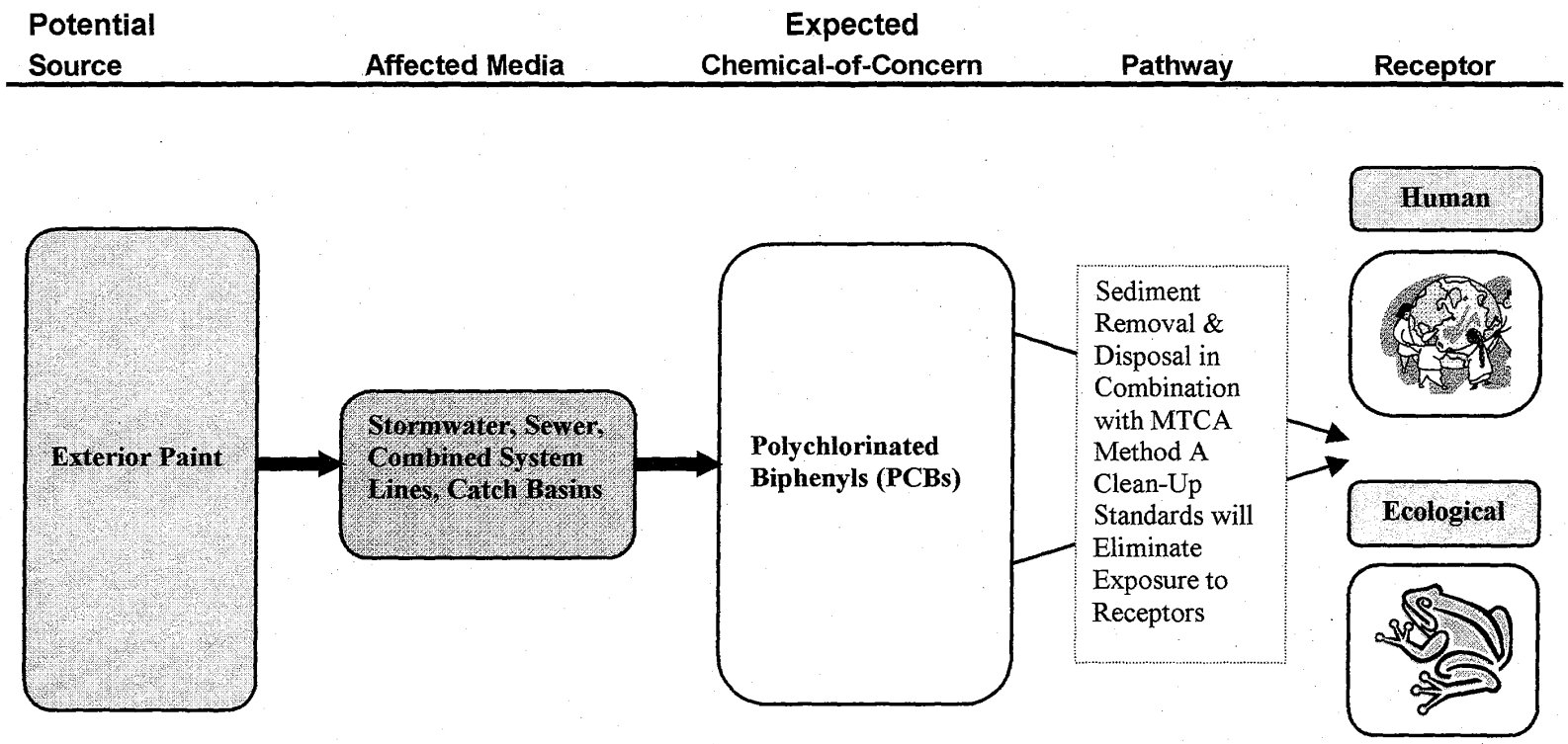
January 3, 2008

Conceptual Site Model

Figure 1



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Former Rainier Brewery Property

1.0 Introduction

The purpose of the QA/QC Plan is to relate project objectives to specific measurements required to achieve those objectives. This Plan will provide sufficient detail to demonstrate the following:

- Intended measurements are appropriate for achieving project objectives
- Quality control procedures are sufficient for obtaining data of known and adequate quality
- Such data will be defensible if challenged technically or legally

This QA/QC Plan will support analytical results, which may be used to evaluate and select basic options required to draft a Corrective Action Plan and to assess unexplored areas on the site, which may lead to further investigation. The Field Sampling Plan contains many of the elements that are required in this QA/QC Plan. In an effort to prevent confusion for field technicians, chemists and reviewers please reference the Field Sampling Plan and Data Quality Objective Plan for the following QA/QC elements.

- The site background and environmental overview
- Statement of project objectives
- Sample collection design for critical and non-critical measurements
- Tabular summary for type and number of samples, sampling points, quality control and reserve sample collection and analysis
- Tabular summary of conventional chemistry parameters
- Sample collection schedule
- Applicable regulations

- Sampling site location, procedures, frequency, affected media and validity
- Analytical laboratory methods, e.g., EPA Standard Methods
- Quality control checks
- Required containers, holding times and preservation techniques

2.0 Project Organization and Responsibilities

Figure 1 presents the project's organizational chart. The Washington State Department of Ecology (Ecology) is responsible for the overall project. The Ecology Project Manager is Dan Cargill.

The Former Rainier Brewery Property is owned by Rainier Commons, LLC. Eitan Alon represents the LLC.

Conrad Vernon of Vernon Environmental, Inc. is an environmental consultant to the Project LLC and is responsible for project management. Technical and administrative elements are included in his project management responsibilities.

Conrad Vernon of Vernon Environmental, Inc. is the quality assurance manger for this project as well. He is responsible for writing and following through with the data quality objectives, sampling plan and QA/QC plan.

Kortland Orr of North Creek Analytical Laboratories is responsible for managing collected sample analyses. He is also responsible for sample preparation and ensuring the laboratory's QA/QC results are valid.

TBD of Vernon Environmental, Inc. is responsible for sample collection, preservation, holding times and transport. He is also responsible for field related QA/QC objectives, as well as, health and safety.

3.0 Quality Assurance Objectives

The following text presents the projects quantitative objectives. Quantitative objectives include analytical result precision, accuracy, method detection limits and completeness. Table 1 presents the quantitative objectives for this project.

Qualitative quality assurance objectives include data set comparability and representativeness. Comparability will be achieved by using consistent sample collection and analytical methods. Vernon Environmental is a reliable source for field related sample collection activities. North Creek Analytical is a reliable source for analytical method protocols. Representativeness will be achieved by collecting an adequate number

of unbiased samples. The data quality objectives attached to the sampling plan assist in making this determination.

Completeness will also be part of this plan. A ninety (90) percent goal has been established (90% of the total number of samples collected and analyzed will have results that pass data validation).

4.0 Sample Custody

Proper sample custody ensures that analytical results will not be compromised during transportation and storage. Records of everyone involved with handling the samples will be maintained so that a sample history can be reconstructed later, should the need arise. Please reference the Sampling Plan regarding how sample custody will be maintained and recorded from the field to the laboratory. Typical chain-of-custody reports, sample container labels, and custody seals will be used.

North Creek Analytical Laboratory is responsible for in-house chain-of-custody. Sample tracking will be recorded throughout laboratory locations for unpacking, extracting, and analysis. A paper trail will be provided to document intra laboratory chain-of-custody. Also, North Creek will document proper disposal of all samples.

5.0 Data Reduction, Validation and Reporting

Figure 2 shows the overall schematic of data flow. The schematic flow chart indicates the process for data handling, collection, transfer, storage, recovery and review for field and laboratory operations.

5.1 Data Reduction

Kortland Orr and Conrad Vernon will be responsible for data reduction. EPA and ASTM Standard Methods for data reduction procedures will be followed. Analytical results will be compared to QA/QC parameters for each analyzed chemical. Blanks will be included in determining analyte concentration, if the blank samples are above method detection limits, by subtracting the blank sample concentration from the field sample concentration. All soil data will be reported on a dry weight basis.

5.2 Data Validation

The data validator will review all analytical results and compare them to established QA/QC controls (reference the Field Sampling Plan). The validator will flag data outliers.

5.3 Data Reporting

The data validation subcontractor will be responsible for reporting analytical as well as QA/QC results. Conrad Vernon will prepare the data report with input from the field technician regarding hydrogeologic data, field notes, sample plan changes, and health and safety. Please reference the Field Sampling Plan for reviewing matrix, units of measurement, etc.

6.0 Calculation of Data Quality Indicators

Precision will be calculated from duplicate measurements relative percent difference (RPD).

$$RPD = \frac{(C1 - C2) \times 100\%}{(C1 + C2) / 2}$$

where: RPD = relative percent difference
C1 = larger of the two observed values
C2 = smaller of the two values

Accuracy will be calculated as percent recovery involving matrix spike measurements (%R).

$$\%R = 100\% \times (s - u / Csa)$$

where: %R = percent recovery
S = measured concentration in spiked aliquot
U = measured concentration in unspiked aliquot
Csa = actual concentration of spike added

Completeness will be defined as percent completeness.

$$\%C = 100\% \times (V / N)$$

where: %C = percent completeness
V = number of measurements judged valid
N = total number of measurements necessary to achieve a specified level of confidence in decision making

Tables and Figures

Quality Assurance Project Plan Approval Form
For
Former Rainier Brewery Property

Project ID No.: 031506 **Work Plan No.:** 2

Client: Ariel Development **Client Contact:** Eitan Alon

QA Project Plan Title: QA/QC Plan, Former Rainier Brewery Property

Commitment to Implement the Above QA Project Plan:

Project Task Manager	**Signature**	**Date**
QA/QC Manager	**Signature**	**Date**
Other as Appropriate Affiliation*	**Signature**	**Date**
Other as Appropriate Affiliation*	**Signature**	**Date**
Other as Appropriate Affiliation*	**Signature**	**Date**

***Commitment signature is required for any ancillary sampling, analytical, or data gathering support provided by a subcontractor or principal investigator.**

Approval to Proceed in Accordance to the above project plan:

Technical Project Manager	**Signature**	**Date**

Concurrences:

QA Project Manager	**Signature**	**Date**
Regulator Project Manager (If Applicable)	**Signature**	**Date**

Figure 1

Project Organizational Chart

Former Rainier Brewery property

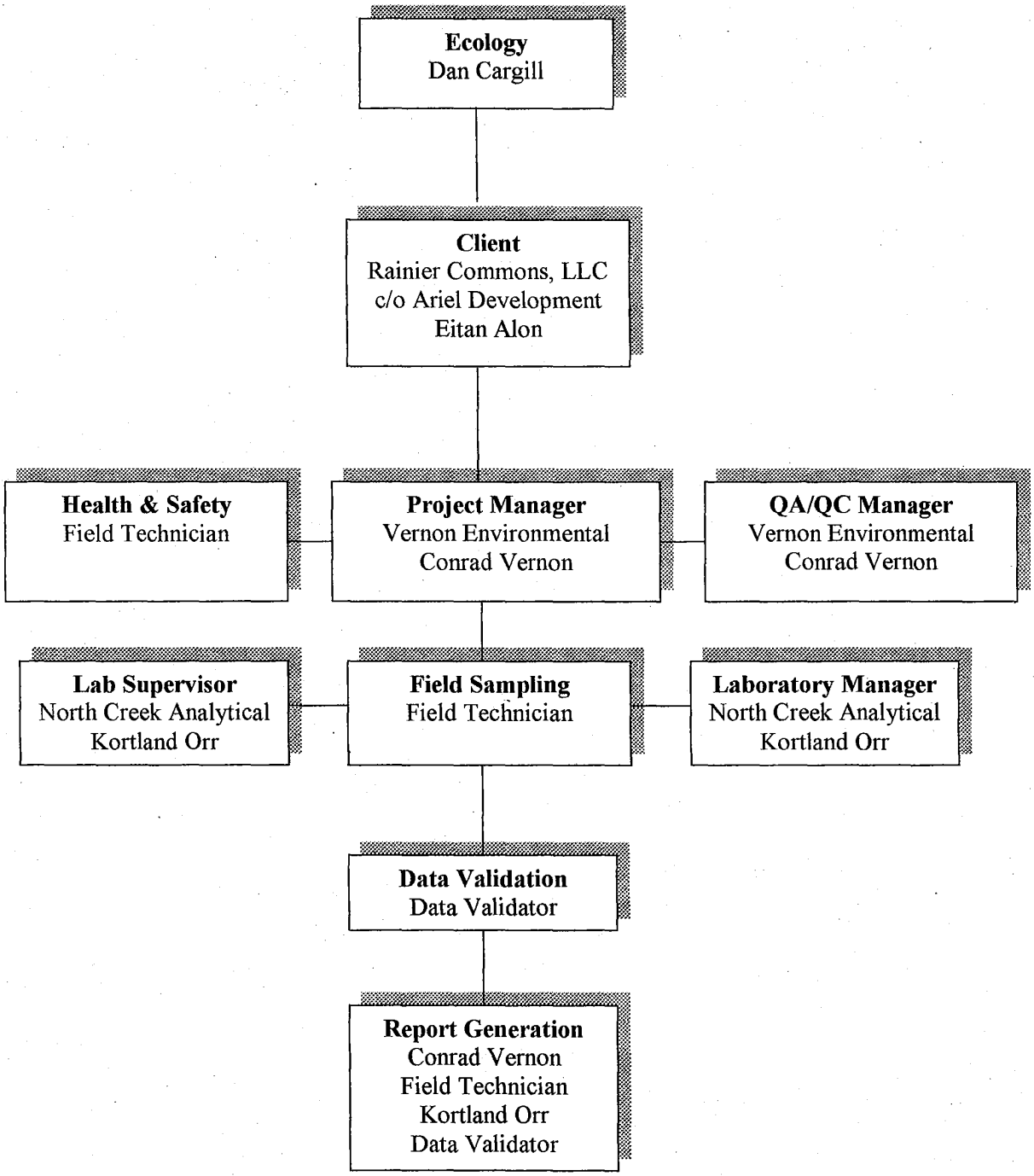

Figure 2

Data Flow Schematic (Data Reduction, Validation, Reporting)

Former Rainier Brewery Property

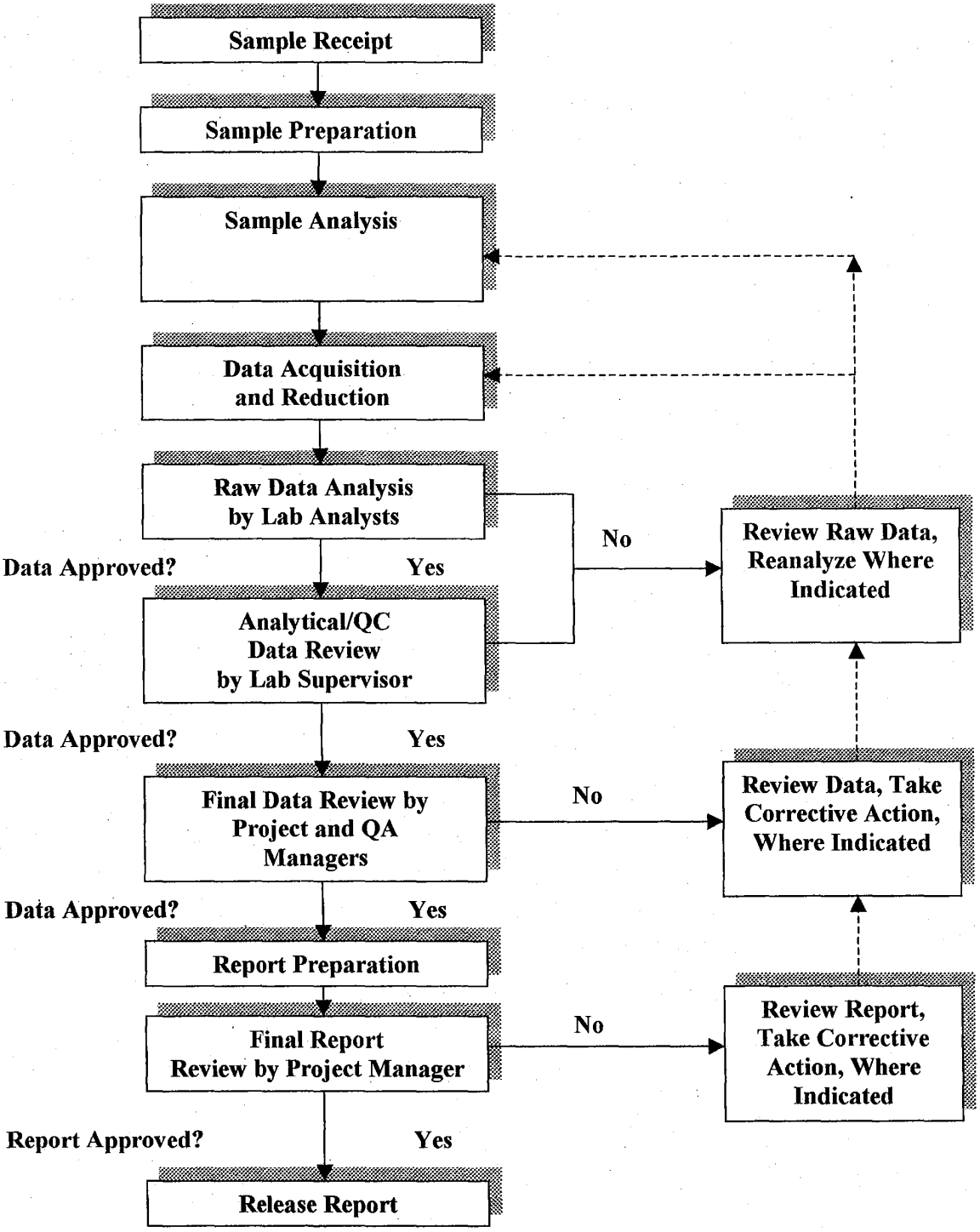

TABLE 1

QUANITATIVE OBJECTIVES

Analytical Method Details

Method	Analyte	MDL	MRL	Units	Surr. %R	DUP RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike %R	Blank Spike RPD	CAS #
Polychlorinated Biphenyls by EPA Method 8082 in Soil											
EPA 8082	Aroclor 1016	2.66	25.0	ug/kg dry wt	-	-	47-134	35	54-125	30	12674-11-2
EPA 8082	Aroclor 1016 [2C]	2.66	25.0	ug/kg dry wt	-	-	47-134	35	54-125	30	12674-11-2
EPA 8082	Aroclor 1221	13.3	50.0	ug/kg dry wt	-	-	-	-	-	-	11104-28-2
EPA 8082	Aroclor 1221 [2C]	13.3	50.0	ug/kg dry wt	-	-	-	-	-	-	11104-28-2
EPA 8082	Aroclor 1232	5.76	25.0	ug/kg dry wt	-	-	-	-	-	-	11141-16-5
EPA 8082	Aroclor 1232 [2C]	5.76	25.0	ug/kg dry wt	-	-	-	-	-	-	11141-16-5
EPA 8082	Aroclor 1242	2.08	25.0	ug/kg dry wt	-	-	-	-	-	-	53469-21-9
EPA 8082	Aroclor 1242 [2C]	2.08	25.0	ug/kg dry wt	-	-	-	-	-	-	53469-21-9
EPA 8082	Aroclor 1248	1.78	25.0	ug/kg dry wt	-	-	-	-	-	-	12672-29-6
EPA 8082	Aroclor 1248 [2C]	1.78	25.0	ug/kg dry wt	-	-	-	-	-	-	12672-29-6
EPA 8082	Aroclor 1254	1.49	25.0	ug/kg dry wt	-	-	-	-	-	-	11097-69-1
EPA 8082	Aroclor 1254 [2C]	1.49	25.0	ug/kg dry wt	-	-	-	-	-	-	11097-69-1
EPA 8082	Aroclor 1260	3.80	25.0	ug/kg dry wt	-	-	22-171	35	58-128	30	11096-82-5
EPA 8082	Aroclor 1260 [2C]	3.80	25.0	ug/kg dry wt	-	-	22-171	35	58-128	30	11096-82-5
EPA 8082	Aroclor 1262	1.46	25.0	ug/kg dry wt	-	-	-	-	-	-	37324-23-5
EPA 8082	Aroclor 1262 [2C]	1.46	25.0	ug/kg dry wt	-	-	-	-	-	-	37324-23-5
EPA 8082	Aroclor 1268	6.20	25.0	ug/kg dry wt	-	-	-	-	-	-	11100-14-4
EPA 8082	Aroclor 1268 [2C]	6.20	25.0	ug/kg dry wt	-	-	-	-	-	-	11100-14-4
EPA 8082	TCX			Surrogate	39-139	-	-	-	-	-	877-09-8
EPA 8082	TCX [2C]			Surrogate	39-139	-	-	-	-	-	877-09-8
EPA 8082	Decachlorobiphenyl			Surrogate	33-163	-	-	-	-	-	2051-24-3
EPA 8082	Decachlorobiphenyl [2C]			Surrogate	33-163	-	-	-	-	-	2051-24-3
Polychlorinated Biphenyls by EPA Method 8082 in Wipe											
EPA 8082	Aroclor 1016	0.500	2.00	ug/Wipe	-	-	70-130	25	70-130	25	12674-11-2
EPA 8082	Aroclor 1016 [2C]	0.500	2.00	ug/Wipe	-	-	70-130	25	70-130	25	12674-11-2
EPA 8082	Aroclor 1221	0.500	2.00	ug/Wipe	-	-	-	-	-	-	11104-28-2
EPA 8082	Aroclor 1221 [2C]	0.500	2.00	ug/Wipe	-	-	-	-	-	-	11104-28-2
EPA 8082	Aroclor 1232	0.500	2.00	ug/Wipe	-	-	-	-	-	-	11141-16-5
EPA 8082	Aroclor 1232 [2C]	0.500	2.00	ug/Wipe	-	-	-	-	-	-	11141-16-5
EPA 8082	Aroclor 1242	0.500	2.00	ug/Wipe	-	-	-	-	-	-	53469-21-9
EPA 8082	Aroclor 1242 [2C]	0.500	2.00	ug/Wipe	-	-	-	-	-	-	53469-21-9
EPA 8082	Aroclor 1248	0.500	2.00	ug/Wipe	-	-	-	-	-	-	12672-29-6
EPA 8082	Aroclor 1248 [2C]	0.500	2.00	ug/Wipe	-	-	-	-	-	-	12672-29-6
EPA 8082	Aroclor 1254	0.500	2.00	ug/Wipe	-	-	-	-	-	-	11097-69-1
EPA 8082	Aroclor 1254 [2C]	0.500	2.00	ug/Wipe	-	-	-	-	-	-	11097-69-1
EPA 8082	Aroclor 1260	0.500	2.00	ug/Wipe	-	-	52-140	25	52-140	25	11096-82-5
EPA 8082	Aroclor 1260 [2C]	0.500	2.00	ug/Wipe	-	-	52-140	25	52-140	25	11096-82-5
EPA 8082	Aroclor 1262	0.500	2.00	ug/Wipe	-	-	-	-	-	-	37324-23-5

EPA 8082	Aroclor 1262 [2C]	0.500	2.00	ug/Wipe	-	-	-	-	-	-	37324-23-5
EPA 8082	Aroclor 1268	0.500	2.00	ug/Wipe	-	-	-	-	-	-	11100-14-4
EPA 8082	Aroclor 1268 [2C]			ug/Wipe	-	-	-	-	-	-	11100-14-4
EPA 8082	TCX			Surrogate	40-130	-	-	-	-	-	877-09-8
EPA 8082	TCX [2C]			Surrogate	40-130	-	-	-	-	-	877-09-8
EPA 8082	Decachlorobiphenyl			Surrogate	40-130	-	-	-	-	-	2051-24-3
EPA 8082	Decachlorobiphenyl [2C]			Surrogate	40-130	-	-	-	-	-	2051-24-3